

Claims

- [c1] A multiband antenna comprising:
- a terminating end connectable to transmitter/receiver apparatus and a distal end opposite the terminating end;
 - a solid core wire extending between the terminating end and the distal end and having an overall electrical length equivalent to one-quarter wavelength of a frequency in a predetermined frequency range lower than a tire pressure monitoring frequency range;
 - a tire pressure monitoring frequency self-resonant circuit section disposed a predetermined distance from the terminating end such that a portion of the solid core wire between the tire pressure monitoring frequency self-resonant circuit section and the terminating end has an electrical length equivalent to one-quarter wavelength in the tire pressure monitoring frequency range; and
 - the tire pressure monitoring frequency self-resonant circuit section comprising, in combination, a portion of the solid core wire formed into a multiple-turn coiled section wherein the self-resonant circuit section has a signal blocking impedance at a tire pressure monitoring frequency defined by an inductive component provided by turns of the respective multiple-turn coiled section and a capacitive component provided by stray capacitance across the turns of the respective multiple-turn coiled section;
- whereby when the antenna is connected to a multiplexer on a vehicle equipped with a wireless tire pressure monitor apparatus transmitting in the tire pressure monitoring frequency range, the antenna will optimally receive and conduct signals in both the tire pressure monitoring frequency range and the lower frequency range.

- [c2] An antenna according to claim 1 further comprising a second self-resonant circuit section disposed between the distal end and the tire pressure monitoring frequency self-resonant circuit section such that a portion of the solid core wire between the second self-resonant circuit section and the terminating end has an electrical length equivalent to one-quarter wavelength in the FM frequency range.
- [c3] An antenna according to claim 1 wherein the multiple-turn coiled section of the tire pressure monitoring frequency self-resonant circuit section comprises 7-10 turns.
- [c4] An antenna according to claim 1 wherein a layer of conductive material is disposed internal of the multiple-turn coiled section of the tire pressure monitoring frequency self-resonant circuit section and a layer of dielectric material is disposed between the layer of conductive material and the multiple-turn coiled section.
- [c5] An antenna according to claim 4 wherein the multiple-turn coiled section of the tire pressure monitoring frequency self-resonant circuit section comprises 3-5 turns.
- [c6] A multiband antenna system for installation in a vehicle comprising:
An antenna having a terminating end connectable to transmitter/receiver apparatus and a distal end opposite the terminating end;
a solid core wire extending between the terminating end and the distal end and having an overall electrical length equivalent to one-quarter wavelength of a frequency in a CB frequency range;
a tire pressure monitoring frequency self-resonant circuit section disposed a predetermined distance from the terminating end such that a portion of the solid core wire between the tire pressure monitoring

frequency self-resonant circuit section and the terminating end has an electrical length equivalent to one-quarter wavelength in the tire pressure monitoring frequency range;

the tire pressure monitoring frequency self-resonant circuit section comprising, in combination, a portion of the solid core wire formed into a multiple-turn coiled section wherein the self-resonant circuit section has a signal blocking impedance at a tire pressure monitoring frequency defined by an inductive component provided by turns of the respective multiple-turn coiled section and a capacitive component provided by stray capacitance across the turns of the respective multiple-turn coiled section; and

transmitter/receiver apparatus comprising CB radio apparatus and tire pressure monitoring apparatus and a multiplexer circuit for selectively coupling the antenna to the CB radio apparatus and the tire pressure monitoring apparatus, the multiplexer circuit comprising an input conductor connected to the antenna, a first output conductor for connection to the CB radio apparatus and a second output conductor for connection to the tire pressure monitoring apparatus, the multiplexer circuit further comprising at least one L-C circuit connected between the input conductor and the first output conductor and between the first and second output conductors to effectively isolate signals in the CB frequency range and the tire pressure monitoring frequency range from each other.

- [c7] The antenna system of claim 6 wherein the antenna further comprises a second self resonant circuit section disposed between the distal end and the tire pressure monitoring frequency self-resonant circuit section such that a portion of the solid core wire between the second self-resonant

circuit section and the terminating end has an electrical length equivalent to one-quarter wavelength in the FM frequency range and wherein the multiplexer circuit has a third output conductor for connection to AM/FM radio apparatus and a series L-C circuit connected between the input conductor and the first output conductor providing blocking impedance to signals in the AM/FM frequency range.

[c8] The antenna system in accordance with claim 7 comprising a parallel L-C circuit connected between the input conductor and the third output conductor for blocking signals in the CB frequency range and an additional inductor connected in series with the parallel L-C circuit for blocking signals in the tire pressure monitoring frequency range.

[c9] The antenna system in accordance with claim 6 and further comprising a second antenna identical to the first, the second antenna being connected to the multiplexer circuit via a second input conductor with an inductor connected between the second antenna and the respective input conductor for blocking signals in the tire pressure monitoring frequency range from the second antenna.

[c10] A multiplexer circuit for selectively coupling an antenna to CB radio apparatus and to FM radio apparatus and to tire pressure monitoring apparatus, the multiplexer circuit comprising:
an input conductor for connection to the antenna;
a first output conductor for connection to a CB radio apparatus;
a second output conductor for connection to a AM/FM radio apparatus;
a third output conductor for connection to a tire pressure monitoring apparatus; and
a series L-C circuit connected between the input conductor and the first output conductor and comprising a first inductor and a first capacitor

connected in series and providing a blocking impedance to signals in the AM/FM range.

[c11] The multiplexer circuit in accordance with claim 10 and further comprising a parallel L-C circuit connected between the input conductor and the second output conductor for blocking signals in the CB frequency range and an additional inductor connected in series with the parallel L-C circuit for blocking signals in the tire pressure monitoring frequency range.

[c12] The multiplexer circuit in accordance with claim 11 and further comprising a capacitor connected between the input conductor and the third output conductor for blocking lower frequency signals in the CB and FM frequency ranges.